

TSD/CB Memo #67-130
11 May 1967

MEMORANDUM FOR: AOB/TRO

ATTENTION :

STAT

SUBJECT : Diode Protection for Parallel Strings in
Battery Packs

1. This was done in the past, but there were two basic problems:

- a. Excessive voltage drop across the diode - 0.6 volts for silicon (15% for a 4 volt battery);
- b. Accidental shorting of battery (as in making a voltage check) resulting in burning out the diode.

Both these problems can be avoided while still providing the desired isolation of parallel battery strings.

2. First, a transistor should be used instead of a simple diode. When doing this

- a. Connect the collector to the base and use this common contact as a "diode negative."
- b. Use the Emitter as the "diode positive."

This results in a base emitter diode, with collector gain.

3. In this configuration, high currents can be handled for relatively long periods of time (accidental shorting of battery) and voltage drops across the element are kept quite low.

4. We have looked at a Germanium transistor,

RCA 2N1183

which works quite nicely (it is slightly larger than a standard transistor, about 1/2 inch in diameter). This unit is a so-called "power chip" and can handle rather large currents. We have put a constant 3 amps through these units (connected as above) until they were too hot to touch, and no damage occurred. Short pulses of much high currents can also be tolerated. Its voltage drop characteristics are as follows:

- a. Load current - 50 ma, IR = 0.3 volts
- b. Load current = 10 ma, IR = 0.2 volts
- c. Load current = 5 ma, IR = 0.1 volts
- d. Load current less than 5 ma, IR less than 0.1 volts

When using this transistor configuration as a diode, the reverse rating is 15 volts, which is sufficient to handle most of our target equipment.

5. If I can be of any further help, please call.

TSD/CB

STAT

Page Denied

Next 4 Page(s) In Document Denied